

Claims

1. A method for buffering data streams of same data type, wherein
- 5 - a first read data stream contains labels marking entry points for seamlessly switching to data from another stream of same data type;
 - the first read data stream including the labels is buffered in a buffer;
 - 10 - a request for seamlessly switching to a second data stream of same data type is received, the second data stream being contained in a different file than the first data stream;
 - an entry point for seamless switching to the second data stream is determined within the buffered first data stream by selecting the first label (L2*) that is buffered after a minimum amount (L1) of buffered data, the minimum amount (L1) being the maximum amount of data that may be read out of the buffer during a specified time (t_{\min}), wherein the specified time (t_{\min}) is the time between receiving said request and buffering the second data stream; and
 - 15 - the second data stream is read and buffered in at least logically the same buffer, the buffering starting from said first label (L2*).
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2. Method according to claim 1, wherein pointers containing the buffer address of the buffered entry points are buffered separately, and are used for determining said first label (L2*).

3. Apparatus for buffering data streams of same data type, wherein the data streams are contained in different files and a data stream may contain labels marking entry points for seamlessly switching to data from another stream, the apparatus comprising:
- 5 - means for receiving data streams or reading data streams from a storage medium;
 - first buffer for buffering a first data stream, including the contained labels;
 - 10 - means for receiving a request for seamlessly switching to a second data stream of same data type as the first data stream;
 - means for determining within the buffered first data stream an entry point for seamless switching to the second data stream, wherein the entry point is determined by selecting the first label ($L2^*$) that is buffered after a minimum amount ($L1$) of buffered data, the minimum amount ($L1$) being the maximum amount of data that may be read out of the buffer during a specified time (t_{min}), wherein the specified time (t_{min}) is the time between receiving said request and buffering the second data stream; and
 - 15 - means for buffering the second data stream in the first buffer, wherein the buffering starts from said first label ($L2^*$).
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4. Apparatus according to claim 3, further comprising a separate buffer for buffering pointers, the pointers indicating positions in the first buffer where the entry points are buffered and being used for determining said first label ($L2^*$).

5. Method or apparatus according to any of the previous claims, wherein said data type is video, audio or subtitle data.
- 5 6. Method or apparatus according to the previous claim, wherein said buffered data may be read, without interruptions and without buffer underrun, after an initial filling procedure, the initial filling procedure comprising filling the audio and subtitle
10 buffers partly before filling the video buffer completely.
7. Method or apparatus according to any of the previous claims, wherein the first and the second data stream
15 are read from the same storage medium.
8. Method or apparatus according to the previous claim, wherein the storage medium is a removable optical disc.
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9. Method or apparatus according to any of the previous claims, wherein the data stream is an MPEG video stream, and an entry point is a group-of-pictures boundary.
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10. Method or apparatus according to any of the previous claims, wherein the method or apparatus is used for video angle switching.
- 30 11. Method or apparatus according to any of the previous claims, wherein a label may refer to a plurality of specific second data streams of same data type, wherein an arbitrary method is used to determine

the second data stream to be read or received.